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ABSTRACT

Statistics on football fatalities from 1931 to 1979 are presented. The report shows that the number of direct fatalities has progressively decreased. This decrease is attributed to changes in the rules of football, improvement of equipment, and more careful monitoring of the activity by coaches and others in positions of responsibility. A discussion of football safety is presented and recommendations are made for preventing further fatalities. Tables display the number of fatalities directly and indirectly due to football in sandlot, professional, semiprofessional, high school, and college games. (JD)

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FORTY-EIGHTH ANNUAL SURVEY OF FOOTBALL FATALITIES 1931-1979

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Submitted February, 1980

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Section I
INTRODUCTION

In 1931 the American Football Coaches Association initiated the First Annual Survey of Football Fatalities. The primary purpose of the Football Fatality Survey is to make the game of football a safer and, therefore, a more enjoyable sports activity. Because of these surveys, the game of football has realized many benefits in regard to rule changes and improvement of equipment.

The original survey committee was chaired from 1931 to 1941 by Marvin A. Stevens, M.D., of Yale University. Dr. Floyd R. Eastwood succeeded Dr. Stevens in 1942 and directed the Football Fatalities Survey through the season of 1964. In January 1965, Carl S. Blyth was appointed by the American Football Coaches Association and the National Collegiate Athletic Association to succeed Dr. Floyd R. Eastwood. Dr. Blyth was directed to compile and prepare the Football Fatality Survey report on the college, professional and sandlot levels. Mr. Richard D. Schindler of The National Federation of State High School Associations assumed complete responsibility for collecting and preparing the senior and junior high school phase of the Football Fatality Survey.

At the conclusion of the 1979 football season, both reports of the Football Fatality surveys were compiled into this final report. This report is sponsored by the American Football Coaches Association, the National Collegiate Athletic Association, and The National Federation of State High School Associations.

All materials in this report dealing with high school football fatalities were gathered and compiled by The National Federation of State High School Associations under the direction of Mr. Richard D. Schindler.

Acknowledgements

This 1979 report was compiled with the assistance of association executive officers, high school and college coaches, athletic directors, school administrators, physicians, a national newspaper clipping agency, and professional associates of the authors of this report.

Throughout the year, upon notification of a suspected football fatality, immediate contact was made with the appropriate officials. In every case the appropriate officials (coaches, administrators, physicians) responded to the inquiries. The data collecting forms were returned and in many cases covering letters were included giving more valuable information. In several instances of reported cases of football fatalities, the respondent stated that the fatality should not be attributed to football. Reasons for these statements were that the fatally injured were not playing football when the accident occurred. And further, some of the reported fatalities were attributed to physical defects that were unrelated to football injuries. Dr. Fred Mueller also assisted in compilation of this year's survey.

Section II
SUMMARY

1. Four fatalities were directly related to football during the year 1979. Three of the fatalities occurred in high school football and one in college football (Table 1).

2. Ten football fatalities were associated with indirect causes (heat stroke, heart failure, etc.).

3. The incidence of direct fatal injuries is very low on a 100,000 player exposure basis. The average number of fatalities for 1979 was .25 participants per 100,000 players.

4. Most direct fatal injuries usually occur during regularly scheduled games. During the 1979 season one

fatality occurred in a game and three occurred in practice.

5. The 1979 survey shows that the greatest number (two or 50 percent) of fatalities occurred during September.

6. The major activities in football would naturally account for the greatest number of direct fatalities. In 1979 tackling incurred two fatalities and being tackled resulted in one. The activity involved in one fatality was unknown.

7. In 1979 three of the direct fatal injuries resulted from injuries to the head. One fatality resulted from injury to the spinal cord.

8. In many cases football cannot be directly responsible for fatal injuries. In 1979 indirect fatalities numbered ten. Two of these ten were the result of heat stress problems.

Section III
DISCUSSION AND RECOMMENDATIONS

This report shows that the number of direct fatalities dramatically decreased when compared with the reports of the past twenty-five years.

In their effort to reduce serious injuries and fatalities, the football rules governing bodies, as well as the administrative organizations, made some rule changes for the 1976 football season. The primary rule change eliminates the head as a primary and initial contact area for blocking and tackling.

The equipment for football athletes continues to improve under the guidance of the National Operating Committee on Standards for Athletic Equipment (NOCSAE). The NOCSAE organizations continue their research on improving helmets for football. The authors of this study are firmly convinced that the rule changes that eliminate the head in blocking and tackling and the helmet research of NOCSAE have played the primary role in reducing fatalities and serious head injuries in football.

The criteria used in this report which classify football fatalities as *Direct* and *Indirect* are as follows:

Direct—Those deaths which resulted directly from participation in football.

Indirect—The indirect football fatalities are those which are caused by systematic failure as a result of exertion while participating in football activity or by a complication which was secondary to a non-fatal injury.

Since 1960 most of the direct fatalities have been caused by head and neck injuries. The 1979 Survey shows three of the direct fatalities resulted from injuries to the head. One fatality was the result of a neck injury. We must continue to reduce head and neck injuries. It has been suggested that the increased protection afforded by recent advances in protective equipment encourages young athletes to take undue risks when executing football skills. Several suggestions for reducing head and neck injuries are as follows:

1. Athletes must be given proper conditioning exercises which will strengthen their necks so that participants will be able to hold their heads firmly erect when making contact.

2. Coaches should drill the athletes in proper execution in the fundamentals of football skills, particularly blocking and tackling.

3. Both coaches and officials should discourage the players from using their heads as battering rams when blocking and tackling. The coaches and officials should enforce the rules prohibiting spearing in practice and in games. The players should be taught to respect the helmet as a protective device and that the helmet should not be used as a weapon. All coaches, physicians, and trainers should take special care to see that the player's equipment is properly fitted, particularly the helmet. Enforcement of the rules prohibiting "spearing," *properly fitted helmets*, and excellent physical condition are the factors which will help reduce fatalities and serious head and neck injuries resulting from participation in football.

All reports stated that player equipment was satisfactory and did not contribute to any of the fatalities. Nevertheless, it is imperative that old and worn equipment be properly renovated or discarded. It is also imperative that all athletes wear properly fitted equipment. Emphasis should always be placed on developing the best equipment possible. Manufacturers, coaches, trainers and physicians should continue their joint and individual efforts toward this end.

It should be mandatory that all football players receive thorough and complete medical examinations and medical histories at the beginning of each football season. The complete medical examination and medical history should be on file with the proper authorities before an athlete is permitted to participate in any phase of the football program. It should also be required that a physician give written approval to permit a player to return to practice and competition after injury.

Whenever possible, a physician should be on the field of play during game and practice sessions. When this is not possible, arrangements must be made in advance to obtain a physician's immediate service when emergencies arise. Each institution should have a team trainer who is a regular member of the institution's staff and who is qualified in treating and preventing injuries.

Since the inception of the Annual Football Fatalities Survey in 1931 and through 1963, there have been fifteen cases of heat stroke reported which resulted in death. In 1964 there were four cases of heat stroke, and in 1965 six cases of heat stroke resulting in death were reported. One of the eight indirect fatalities of 1966 resulted from heat stroke, and two heat stroke cases resulting in death were reported in 1967. In 1968 and 1969 five of the indirect fatalities resulted from heat stroke or heat exhaustion. In 1970 eight of the fourteen indirect fatalities resulted from heat stroke, and in 1971 four of the twelve indirect fatalities resulted from heat illness. In 1972 seven of the indirect fatalities resulted from heat illness. In 1973 three of the eight indirect fatalities resulted from heat illness. In 1974 and 1975 none of the indirect fatalities resulted from heat illness. In 1976 and 1977 one of the indirect fatalities in each year resulted from

heat illness. In 1978 there was a dramatic increase of heat stress deaths to four. In 1979 there were two heat related deaths. *All coaches, trainers, and physicians should continue their efforts toward eliminating athletic fatalities which result from physical activity in hot weather.*

Heat stroke and heat exhaustion are prevented by careful control of various factors in the conditioning program of the athlete. Basic, of course, is an adequate and complete medical examination and medical history prior to participation in football activities. With the start of practice, it is essential to provide for gradual acclimatization to hot weather activity. Equally important is the need to adjust salt and water intake to weather conditions.

When football activity is carried on in hot weather, the following suggestions and precautions should be taken:

1. Schedule sensible practice sessions for early morning or evening during August and early September.
2. Acclimatize athletes to hot weather activity by carefully graduated practice sessions.
3. Provide rest periods of 15-30 minutes during workouts of one hour.
4. Furnish extra water and salt in recommended amounts. A recognized replacement for fluid loss is a sterile 0.1% saline solution—that is, two teaspoonsful of ordinary table salt for each gallon of water. It is generally suggested that it be ingested at the rate of at least one quart per hour during extreme perspiration.
5. Watch athletes carefully for signs of trouble (fatigue, lethargy, inattention, stupor, awkwardness, etc.) particularly the determined athlete who may not report discomfort.
6. Remember, *temperature and humidity*, not the sun, are the important factors and that heat stroke and exhaustion can occur in the shade.
7. Finally, if an emergency arises on the football field, seek a physician's immediate service. DON'T WAIT (see recommendation Number 3).

This year (1979) there were five deaths of football athletes reported that were not related to the athletes' participation in football activity. Medical as well as other evidence revealed that the deceased died of natural or other causes, not as a result of football activity.

Recommendations

Specific recommendations resulting from the findings of the 1979 Football Fatalities Survey Report are as follows:

1. Mandatory medical examinations and medical history should be taken at the beginning of each season before allowing an athlete to participate in football activity. Provide the physician with adequate time to do a complete and thorough physical examination. If the doctor or coach has any questions about the athlete's readiness to participate in football, the athlete should not be allowed to play.
2. All personnel concerned with training football athletes should emphasize proper, gradual and complete physical conditioning. Particular emphasis should be placed on neck strengthening exercises.
3. A physician should be present at all games and practice sessions. If it is impossible for a physician to be present at all practice sessions, emergency measures must be provided.
4. All personnel associated with football participation should be cognizant of the problems and safety measures related to physical activity in hot weather.
5. Each institution should strive to have a team trainer who is a regular member of the faculty and is adequately prepared and qualified.
6. Cooperative liaison should be maintained by all groups interested in the field of Athletic Medicine (coaches, trainers, physicians, manufacturers, administrators, etc.).
7. There should be strict enforcement of game rules, and administrative regulations should be enforced to protect the health of the athlete. Coaches and school officials must support the game officials in their conduct of the athletic contests.
8. There should be a renewed emphasis on employing well-trained athletic personnel, providing excellent facilities, and securing the safest and best equipment possible.
9. There should be continued research concerning the safety factor in football (rules, facilities, equipment, etc.).
10. Of utmost importance, the technique of "spearing" or "goring" must be eliminated from the game of football. This can be accomplished by the strict enforcement of the rules of the game by both coaches and officials.

APPENDIX A
CASE STUDIES DIRECT FATALITIES

College

A 19-year-old student was participating in a spring practice scrimmage on March 31, 1979. His injury was incurred when he executed a solid form tackle. He died on April 6, 1979, from a subdural hematoma.

High School

A student, age 16 years and 2 months, was injured on September 28, 1979, while competing in a football game. The player was a ball carrier. He sustained a head injury when tackled. He died of a subdural hematoma on October 7, 1979.

A student, age 16 years and 5 months, was injured on September 10, 1979, and died the same day from a subdural hematoma. The injury was sustained during a practice session. The individual was a defensive lineman. No specific incident was observed prior to his collapse.

A student, age 18 years, was injured in a football practice on October 30, 1979, while making a tackle. He died in December 1979, and the injury was diagnosed as a fractured cervical vertebra. □

Section IV
TABLE I
Fatalities. Directly Due to Football - 1931-1979*

	SANDLOT	PRO AND SEMIPRO	HIGH SCHOOL	COLLEGE	TOTAL
Year	Direct	Direct	Direct	Direct	Direct
1931	10	3	10	8	31
1932	8	6	8	2	24
1933	8	4	10	2	24
1934	4	3	12	3	23
1935	4	7	14	3	28
1936	11	2	12	1	26
1937	3	4	13	0	20
1938	3	3	8	2	16
1939	1	1	6	3	11
1940	2	1	7	1	11
1941	5	3	6	0	14
1943*	0	1	10	0	11
1944	5	2	9	1	17
1945	3	0	3	0	6
1946	1	5	13	2	21
1947	4	4	14	1	23
1948	6	3	9	0	18
1949	7	3	9	0	19
1950	1	2	11	1	15
1951	3	2	6	1	12
1952	1	0	5	0	6
1953	3	2	6	2	13
1954	3	2	12	2	19
1955	2	0	6	2	10
1956	3	1	12	1	17
1957	2	1	13	0	16
1958	6	0	11	0	17
1959	6	2	7	3	18
1960	1	1	11	1	14
1961	3	0	10	6	19
1962	6	1	12	0	19
1963	1	1	12	2	16
1964	4	1	21	3	29
1965	4	0	20	1	25
1966	4	0	20	0	24
1967	5	0	16	3	24
1968	4	1	26	5	36
1969	3	1	18	1	23
1970	3	0	23	3	29
1971	2	0	15	3	20
1972	3	1	16	2	22
1973	2	0	7	0	9
1974	0	0	10	1	11
1975	1	0	13	1	15
1976	3	0	15	0	18
1977	1	0	8	1	10
1978	0	0	9	0	9
1979	0	0	3	1	4
TOTALS	165	75	547	75	862

*No study was made in 1942.

TABLE II

Fatalities: Indirectly Due to Football - 1931-1979*

	SANDLOT	PRO AND SEMIPRO	HIGH SCHOOL	COLLEGE	TOTAL
Year	Indirect	Indirect	Indirect	Indirect	Indirect
1931	8	0	10	0	18
1932	3	0	9	1	13
1933	7	0	9	3	19
1934	5	0	6	2	13
1935	6	0	11	2	19
1936	5	1	8	4	18
1937	3	0	6	2	11
1938	4	1	5	3	13
1939	1	1	4	1	7
1940	1	0	2	1	4
1941	0	1	3	0	4
1943*	0	0	0	0	0
1944	1	0	1	0	2
1945	2	0	1	0	3
1946	4	0	0	0	4
1947	2	1	2	1	6
1948	3	2	3	0	8
1949	3	2	1	1	7
1950	1	0	2	1	4
1951	3	1	3	1	8
1952	1	0	2	1	4
1953	2	0	4	0	6
1954	3	1	2	0	6
1955	1	0	3	0	4
1956	0	0	4	1	5
1957	0	0	3	1	4
1958	0	0	2	1	3
1959	3	1	6	1	11
1960	0	0	2	2	4
1961	4	1	11	0	16
1962	0	1	4	2	7
1963	2	0	4	2	8
1964	3	0	12	1	16
1965	4	1	14	5	24
1966	0	0	6	2	8
1967	0	0	4	1	5
1968	2	0	8	2	12
1969	3	1	8	3	15
1970	0	0	12	2	14
1971	2	1	7	2	12
1972	0	0	10	1	11
1973	0	0	5	3	8
1974	0	0	5	3	8
1975	2	0	3	3	8
1976	1	0	7	2	10
1977	0	0	6	0	6
1978	0	0	8	1	9
1979	1	0	8	1	10
TOTALS	96	17	256	66	435

*No study was made in 1942.

TABLE III
Direct Fatalities Incidence Per 100,000 - 1931-1979*

YEAR	HIGH SCHOOL	COLLEGE
1931	1.62	12.17
1932	1.29	3.04
1933	1.62	3.04
1934	1.94	4.56
1935	2.27	4.56
1936	1.94	1.52
1937	2.11	0.00
1938	1.29	3.04
1939	0.97	4.56
1940	1.13	1.52
1941	0.97	0.00
1943*	1.62	0.00
1944	1.46	1.52
1945	0.45	0.00
1946	2.11	3.04
1947	2.27	1.52
1948	1.46	0.00
1949	1.46	0.00
1950	1.77	1.52
1951	0.97	1.52
1952	0.81	0.00
1953	0.97	3.04
1954	1.94	3.04
1955	0.97	3.04
1956	2.11	1.52
1957	2.27	0.67
1958	1.78	0.00
1959	1.13	4.56
1960	1.78	1.53
1961	1.62	9.23
1962	1.94	0.00
1963	1.94	3.04
1964	2.23	4.56
1965	2.00	1.33
1966	2.00	0.00
1967	1.60	4.00
1968	2.60	6.60
1969	1.64	1.33
1970	1.92	4.00
1971	1.25	4.00
1972	1.33	2.67
1973	0.58	0.00
1974	0.83	1.33
1975	1.08	1.33
1976	1.00	0.00
1977	0.53	1.33
1978	0.60	0.00
1979	0.23	1.33

*No study was made in 1942.